

## PATENT ABSTRACTS OF JAPAN

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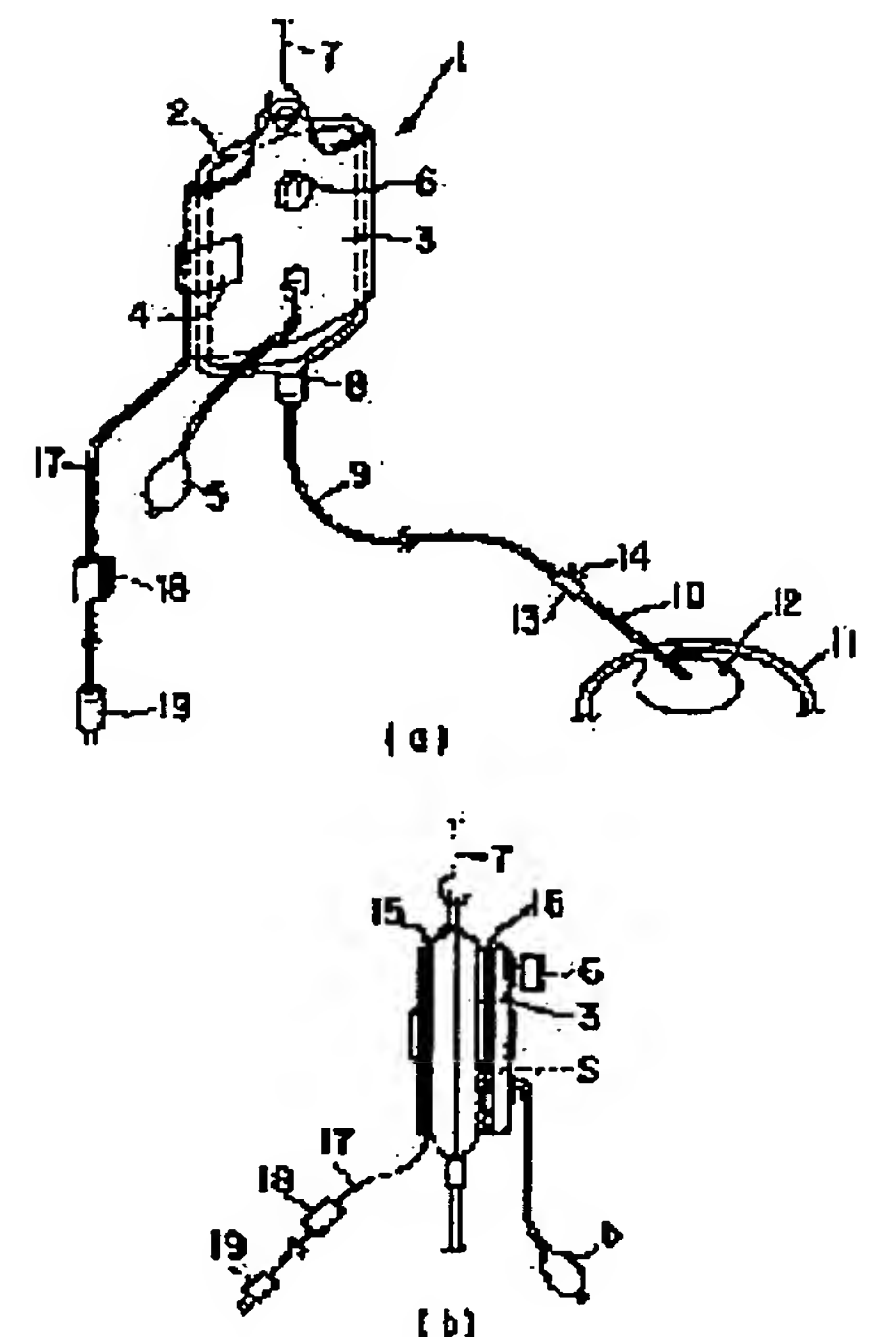
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## (54) LIQUID FEEDING DEVICE

## (57)Abstract:

PROBLEM TO BE SOLVED: To enable heating and feeding a liquid using a small and simple structure.

SOLUTION: A liquid feeding device 1, by which a liquid sealed inside a flexible container 2 is fed into the body via a duct 9 connected to the container 2, includes an expansible main body 3 surrounding the container 2 from outside, a pressurization means 5 which supplies a gas into the main body 3 to expand the main body 3 to pressurize the container 2 surrounded by the main body 3, and a heating means having a heating part 15 provided in the main body 3 to heat the container 2 surrounded by the main body 3.



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**CLAIMS**

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[Claim(s)]

[Claim 1] In the liquid-sending equipment which sends out the liquid enclosed in the flexible container to the inside of the body through the duct where it connects with said container The body which surrounds said container from an outside and in which pinch-and-swell is possible, and an application-of-pressure means to pressurize said container which the gas was supplied in said body, and the body was expanded, and was surrounded with the body, warming which has the exoergic section which warms said container which was prepared in said body and surrounded by the body -- the liquid-sending equipment characterized by providing a means.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the liquid-sending equipment for sending a liquid into the inside of the body.

**[0002]**

**[Description of the Prior Art]** In case the inside of a patient's coelome is observed or treated under endoscope observation, when a therapy part can generally observe clearly neither with bleeding nor body fluid, sending transparent liquids, such as a physiological saline, in a coelome, and washing them is performed. Moreover, in conducting excision of a prostate gland or the operation in a uterus and a joint under endoscope observation, a liquid is poured in into a coelome, and he swells a coelome, and is trying to secure an observation visual field required for treatment.

**[0003]** Thus, the liquid-sending equipment for sending a liquid in a coelome is indicated by JP,7-100205,A. He is trying to send out the liquid in a plastic envelope by the liquid-sending equipment indicated by this official report containing the deformable plastic envelope with which it filled up with the sterilized liquid in a well-closed container, supplying a compressed air in a well-closed container, and carrying out application-of-pressure deformation of the plastic envelope.

**[0004]** Moreover, the liquid-sending equipment which sends out the liquid in a bag to a U.S. Pat. No. 5419772 description by surrounding the flexible bag with which it filled up with the liquid with an application-of-pressure means, sending air into this application-of-pressure means, and carrying out application-of-pressure deformation of the bag is indicated. Furthermore, the liquid-sending equipment which sends a liquid inside of the body is indicated by the U.S. Pat. No. 5178606 description, controlling the pressure, the flow rate, and temperature of a liquid.

**[0005]**

**[Problem(s) to be Solved by the Invention]** In a place There is a trouble which is described below, respectively in the conventional equipment mentioned above. That is, since the liquid-sending equipment indicated by JP,7-100205,A needs to form closing motion means, such as a door, in a well-closed container in order to take a plastic envelope in and out to a well-closed container, and it needs to make a well-closed container proof-pressure structure, equipment is quite large-scale. Moreover, since the device which controls the temperature of a liquid was not established, by the bottom surgical operation of an endoscope which sends in the liquid of a large quantity in a coelome comparatively, a certain treatment had to be devised so that a patient might not cause complication, such as decreased body temperature, to into the trap, and there was a problem in respect of the functionality of equipment.

**[0006]** On the other hand, since he was trying to send out the liquid in a bag to an application-of-pressure means to surround a flexible bag only by sending in air, the liquid-sending equipment indicated by U.S. Pat. No. 5419772 was easy structure, but since the device which controls the temperature of a liquid like the liquid-sending equipment of JP,7-100205,A was not established, there was a problem in respect of functionality too.

**[0007]** On the other hand, although the liquid-sending equipment indicated by U.S. Pat. No. 5178606 controls the temperature of the liquid to pour in, in order that it may soak the container into which the liquid was put in a warm water tub and may send the liquid by the roller pump, it is quite large-sized [ equipment ] and complicated.

**[0008]** This invention is made paying attention to the above-mentioned situation, and the place made into the object is to offer the liquid-sending equipment in which warming and liquid sending of a liquid are possible with small and easy structure.

[0009]

[Means for Solving the Problem] In the liquid-sending equipment which sends out the liquid with which this invention was enclosed in the flexible container in order to solve the above-mentioned technical problem to the inside of the body through the duct where it connects with said container warming which has the exoergic section which warms said container which the gas was supplied in the body which surrounds said container from an outside, and in which pinch-and-swell is possible, and said body, and the body was expanded, and was prepared in an application-of-pressure means to pressurize said container surrounded with the body, and said body, and was surrounded by the body -- the means is provided.

[0010]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained, referring to a drawing. Drawing 1 shows the 1st operation gestalt of this invention. warming which relates to this operation gestalt as shown in (a) of drawing 1 -- liquid-sending equipment 1 has the body 3 which can wrap in the back 2 with whom liquids, such as a sterilized physiological saline, were enclosed from an outside. The stop sections 4, such as a piece of Velcro, are formed in the body 3 so that the back 2 by the body 3 may wrap in and a condition can be held. Moreover, the body 3 has the building envelope S for accumulating gases, such as air, and the pressure meter 6 which displays the application-of-pressure means 5 (for example, bellows-type wobble pump) for sending in a gas in this building envelope S and the pressure in a building envelope S is connected to the body 3 through the duct.

[0011] warming -- liquid-sending equipment 1 is hung with the back 2 by hooking the upper bed section on hook 7. In addition, in doing in this way and hanging the back 2, it makes the connection 8 established in the back 2 located in the bottom.

[0012] The back's 2 connection 8 is formed by elastic members, such as rubber, and a building envelope S and a tube 9 are open for free passage by thrusting into a connection 8 the needlelike puncture member (not shown) prepared at the head of a tube 9, and making it project in the back's 2 building envelope S.

[0013] As shown in (b) of drawing 1, the body 3 has the exoergic layer 15 which consists of heating wire to which it is stuck by the back 2, and the thermal break (the laminating was carried out) 16 prepared in the outside of the exoergic layer 15. In this case, a part of thermal break 16 is inserted between the exoergic layer 15 and a thermal break 16. The power cable 17 is connected to the exoergic layer 15, and this power cable 17 is connected to a source power supply through the switch section 18 and the power-source connector 19. In addition, the switch section 18 builds in temperature control means, such as a thermostat, at the same time it has ON/OFF of a power source switched.

[0014] next, warming of the above-mentioned configuration -- the case where a liquid is sent in a coelome using liquid-sending equipment 1 is explained. first, the back 2 is wrapped in with a body 3 -- as -- warming -- while sticking returning-water equipment 1 to the back 2 and making the back 2 stick the exoergic layer 15 by installation and this, this adhesion condition is held by the stop section 4. In this condition, while hanging a body 3 on hook 7 with the back 2, the power cable 17 connected to the exoergic layer 15 is electrically connected to a source power supply through the power-source connector 19. And air is supplied in the building envelope S of a body 3 with the application-of-pressure means 5 until the inside of a building envelope S reaches a predetermined pressure (thereby, a body 3 expands and presses the back 2 from an outside). In this case, the supplied air into the building envelope S by the application-of-pressure means 5 is performed, checking the value of the pressure in a building envelope S in the pressure meter 6. Moreover, it is parallel to this, ON actuation of the switch section 18 is carried out, and the liquid in the back 2 is warmed to the temperature near temperature (38-40 degrees C).

[0015] Next, the end of a tube 9 is connected to the back's 2 connection 8 through a puncture member, and it connects with the control unit 13 of the water pipe 10 in which the other end of this tube 9 was inserted into the coelome 12 of the body 11. in addition, the thing which the closing motion bulb 14 is formed in the control unit 13 of a water pipe 10, and is done for the switching operation of this closing motion bulb 14 -- warming -- the flow of the liquid from liquid-sending equipment 1 to into a coelome 12 can be controlled now. Of course, a tube 9 may be connected to the liquid-sending channel of the endoscope which observes the inside of a coelome 12 instead of a water pipe 10 and which is not illustrated.

[0016] The closing motion bulb 14 is opened observing the inside of a coelome 12 with the endoscope which is not illustrated, if the above activity is completed. Thereby, the liquid in the back 2 warmed near temperature is sent in in a coelome 12 by the constant rate through a water pipe 10 from a tube 9. Thereby, the inside of a coelome 12 is washed by the liquid.

[0017] it explained above -- as -- warming of this operation gestalt -- liquid-sending equipment 1 is the easy configuration which formed the building envelope S which accumulates air for the back 2 in the wrap body



3 from an outside, and the exoergic layer 15, can warm the liquid enclosed in the back 2, and can send this. That is, the back 2 with whom the sterilized liquid was enclosed when equipping the back 2 with a body 3 and making the back 2 stick the exoergic layer 15 so that the back 2 may be wrapped in can be warmed in the condition as it is, and moreover, if application-of-pressure deformation of the back 2 is carried out by supplying air in the building envelope S of a body 3, the liquid with which it was warmed in the back 2 can be sent easily in a coelome 12. That is, warming and liquid sending of a liquid can be performed with small and easy structure. Therefore, even if it pours the liquid of a large quantity into into the trap inside of the body, a patient does not start complication, such as decreased body temperature.

[0018] Drawing 2 shows the 2nd operation gestalt of this invention. a graphic display -- like -- warming of this operation gestalt -- the body 3 is greatly formed so that liquid-sending equipment 101 can equip with two or more back 2 --. Moreover, the tube 9 linked to the control unit 13 of a water pipe 10 is connected with two or more tubes 21 connected to each back 2 -- through the change bulb 20. In addition, the other configuration is the same as that of the 1st operation gestalt.

[0019] With such a configuration, when the back's 2 one side becomes empty, the change bulb 20 can be operated and the back 2 of another side can be used. That is, by having enabled it to equip with two or more back 2 --, even when consuming a penetrant remover to a large quantity, the time and effort which newly changes the back 2 can be saved.

[0020] Drawing 3 shows the 3rd operation gestalt of this invention. warming concerning this operation gestalt -- the building envelope S and the tube 22 open for free passage are connected to the body 3 (the same configuration as the 1st operation gestalt) of liquid-sending equipment 201. This tube 22 is connected to the compressor 25 through the control device 23 and the tube 24. Moreover, the exoergic layer 15 of a body 3 is electrically connected to the control unit 23 through the power cable 26. In addition, a control device 23 and a compressor 25 are connected to a source power supply through power cables 26 and 27, respectively. And in this case, a control unit 23 carries out ON/OFF control of the actuation of a compressor 25 so that the air of place constant pressure may be sent in the building envelope S of a body 3, and it controls the exoergic layer 15 to predetermined temperature.

[0021] warming of such a configuration -- in sending a liquid in a coelome 12 using liquid-sending equipment 201, it wraps in the back 2 with a body 3 first -- as -- warming -- while sticking returning-water equipment 201 to the back 2 and making the back 2 stick the exoergic layer 15 by installation and this, this adhesion condition is held by the stop section 4. In this condition, while hanging a body 3 on hook 7 with the back 2, the power cable 26 connected to the exoergic layer 15 and the tube 22 attached in the body 3 are connected to a control device 23, and a control device 23 and a compressor 25 are connected to a source power supply through power cables 26 and 27.

[0022] Then, like the 1st operation gestalt, the end of a tube 9 is connected to the back's 2 connection 8 through a puncture member, and it connects with the control unit 13 of the water pipe 10 in which the other end of this tube 9 was inserted into the coelome 12 of the body 11.

[0023] If the above activity is completed, application of pressure and warming of a body 3 will be started by turning on the switch which a control device 23 does not illustrate. Thereby, the back 2 is controlled by a predetermined pressure and temperature. And when the closing motion bulb 14 of a water pipe 10 is opened in this condition, the liquid in the back 2 warmed near temperature minds a water pipe 10 from a tube 9, and it is a coelome at a constant rate. It is sent in in 12 and the inside of a coelome 12 is washed by the liquid.

[0024] it explained above -- as -- warming of this operation gestalt -- since it automates , the means , i.e. , the application of pressure means , supply air in the building envelope S of a body 3 until it becomes place constant pressure , while liquid sending equipment 201 can save the time and effort of the application of pressure activity by the operator , it becomes possible to always maintain a predetermined pressure automatically , and it can always obtain fixed discharge quantity at the time of washing actuation .

[0025] Drawing 4 shows the 4th operation gestalt of this invention. warming which relates to this operation gestalt like a graphic display -- the building envelope S and the tube 22 open for free passage are connected to the body 3 (the same configuration as the 1st operation gestalt) of liquid-sending equipment 301. This tube 22 is connected to the gas bomb 28 through the control device 321. Moreover, the exoergic layer 15 of a body 3 is electrically connected to the control unit 321 through the power cable 26. In addition, the control device 321 contains the bulb which opens and closes the supplied air of the regulator which decompresses the pressure of a gas bomb 28, or gas, and is connected to a source power supply through a power cable 26. Of course, it is good also as a configuration which uses the source of air pressure supply of the medical gas piping system which does not use a gas bomb 28 as a source of gas supply, for example, is installed in the wall of an operating room etc. as a source of gas supply, and connects said source of air pressure supply to a

control unit 321.

[0026] warming of such a configuration -- in sending a liquid in a coelome 12 using liquid-sending equipment 301, it wraps in the back 2 with a body 3 first -- as -- warming -- while sticking returning-water equipment 301 to the back 2 and making the back 2 stick the exoergic layer 15 by installation and this, this adhesion condition is held by the stop section 4. In this condition, while hanging a body 3 on hook 7 with the back 2, the power cable 26 connected to the exoergic layer 15 and the tube 22 attached in the body 3 are connected to a control device 321, and a control device 321 is connected to a source power supply through a power cable 26.

[0027] Then, like the 3rd operation gestalt, the end of a tube 9 is connected to the back's 2 connection 8 through a puncture member, and it connects with the control unit 13 of the water pipe 10 in which the other end of this tube 9 was inserted into the coelome 12 of the body 11.

[0028] If the above activity is completed, application of pressure and warming of a body 3 will be started by turning on the switch which a control device 321 does not illustrate. Thereby, the back 2 is controlled by a predetermined pressure and temperature. And in this condition, if the closing motion bulb 14 of a water pipe 10 is opened, the liquid in the back 2 warmed near temperature will be sent in in a coelome 12 by the constant rate through a water pipe 10 from a tube 9, and the inside of a coelome 12 will be washed by the liquid.

[0029] Drawing 5 shows the 5th operation gestalt of this invention. warming which relates to this operation gestalt as shown in (b) of drawing 5 -- the body 403 of liquid-sending equipment 401 has the exoergic layer 415 to which it is stuck by the back 2, and the thermal break (the laminating was carried out) 16 prepared in the outside of the exoergic layer 415. The chemical which the chemical is enclosed with the interior of the exoergic layer 415, and was enclosed in the exoergic layer 415 by operating the trigger 29 prolonged from the exoergic layer 415 causes a chemical reaction, and generates heat.

[0030] Moreover, body Three kinds of temperature seals 30 are stuck on the outside surface of 403. Above 35 degrees C, an M display seal changes above a L display seal and 40 degrees C, the color of the seal of H display changes reversibly above 45 degrees C, respectively, and the temperature of the back's 2 outline understands this temperature seal 30. In addition, the other configuration is the same as that of the 1st operation gestalt.

[0031] warming of such a configuration -- in sending a liquid in a coelome 12 using liquid-sending equipment 401, it wraps in the back 2 with a body 403 first -- as -- warming -- while sticking returning-water equipment 401 to the back 2 and making the back 2 stick the exoergic layer 415 by installation and this, this adhesion condition is held by the stop section 4. While hanging a body 403 on hook 7 with the back 2, a trigger 29 is operated and the exoergic layer 415 is made to generate heat in this condition. At this time, the back's 2 temperature is displayed with the temperature seal 30. Moreover, simultaneously, air is supplied in the building envelope S of a body 403 with the application-of-pressure means 5 until the inside of the building envelope S of a body 403 reaches a predetermined pressure.

[0032] Then, the end of a tube 9 is connected to the back's 2 connection 8 through a puncture member, and it connects with the control unit 13 of the water pipe 10 in which the other end of this tube 9 was inserted into the coelome 12 of the body 11. And in this condition, if the closing motion bulb 14 of a water pipe 10 is opened, the liquid in the back 2 warmed near temperature will be sent in in a coelome 12 by the constant rate through a water pipe 10 from a tube 9, and the inside of a coelome 12 will be washed by the liquid.

[0033] it explained above -- as -- warming of this operation gestalt -- since the exoergic layer 415 generates heat by the chemical reaction of a chemical, liquid-sending equipment 401 can warm a liquid by an easy configuration and actuation, without using the usual power source.

[0034] Drawing 6 thru/or drawing 8 show the 6th operation gestalt of this invention. warming which relates to this operation gestalt as shown in drawing 6 -- liquid-sending equipment 601 has the case 40. Opening 41 is formed in the lower part of the front face of a case 40. The control section 50 which has an electric power switch 43 and a potentiometer 44 is installed in the case 40 bottom. Moreover, the top face of a case 40 is formed of the door 42 which can be opened and closed.

[0035] As shown in drawing 7, a case 40 can contain them, as two or more back 2 -- by which liquids, such as a physiological saline, were enclosed with the interior is accumulated up mutually. Inside the door 42 which forms the top face of a case 40, the end of two coil springs 48 and 49 is being fixed. Moreover, the press plate 50 for turning caudad two or more back 2 -- contained in a case 40, and pressing them is being fixed to the other end of each coil springs 48 and 49.

[0036] The plane heater 45 is stuck on the part except the top face (medial surface of a door 42) at the inner surface of a case 40. Moreover, the temperature sensor 46 is formed in the base of a case 40. In this case, the



heater 45 and the temperature sensor 46 are electrically connected with the control unit 47 arranged in a control section 50, respectively. Moreover, said potentiometer 44 prepared in the control-section 50 side is also electrically connected to the control unit 47. Moreover, a control device 47 is connected to a source power supply through a power cable 26. In addition, the block diagram having shown these circuitry is shown in drawing 8.

[0037] warming of the above-mentioned configuration -- the case where warm the liquid in the back 2 and the liquid is sent using liquid-sending equipment 601 -- first -- the back Only a required number accumulates 2 into a case 40, and a door 42 is closed. The press plate 50 is pressed against the back 2 located most in an upside by this, and all back 2 -- of a laminating condition is pressurized by the thrust of the press plate 50 accompanying the energization force of coil springs 48 and 49. And the back 2 located in the bottom in this case is the back 2 by whom the laminating was done to thrust and an upside with the press plate 50. -- That internal pressure rises with weight.

[0038] Then, an electric power switch 43 is turned ON and energization to a heater 45 is performed. In this case, a control unit 47 controls the energization to a heater 45 based on the temperature in the case 40 measured with the temperature sensor 46, and the laying temperature set up by the potentiometer 44, and is a case. The temperature in 40 is maintained to the laying temperature set up by the potentiometer 44. Therefore, each back 2 -- The temperature of an inner liquid is warmed and maintained to temperature almost equal to the laying temperature set up by the potentiometer 44.

[0039] Next, the end of a tube 9 is connected to the connection 8 of the back 2 located in the bottom through a puncture member, and it connects with the control unit 13 of the water pipe 10 in which the other end of this tube 9 is inserted by the inside of the body. And in this condition, if the closing motion bulb 14 of a water pipe 10 is opened, the liquid in the back 2 warmed by laying temperature will be sent into the inside of the body by the constant rate through a water pipe 10 from a tube 9, and the inside of the body will be washed by the liquid.

[0040] In addition, after all the liquids of the back 2 located in the bottom are breathed out, the back 2 of the empty is lured from the opening 41 of the front face of a case 40. Thereby, the back 2 located in the empty back 2 upside is depressed by the thrust of the press plate 50, and is located in opening 41.

[0041] it explained above -- as -- warming of this operation gestalt -- liquid-sending equipment 601 -- two or more back 2 -- warming -- since it can have in the condition, even when consuming a liquid to a large quantity, the time and effort of warming can be saved. Moreover, since the back 2 who uses it for a degree is prepared by easy actuation, exchange of the back 2 becomes easy.

[0042] Drawing 9 and drawing 11 show the 7th operation gestalt of this invention. warming which relates to this operation gestalt as shown in drawing 9 -- the case 49 which contains some tubes 9 with which liquid-sending equipment 701 is prolonged from the back 2 with whom liquids, such as a physiological saline, were enclosed -- warming -- it has as a means. In addition, a means to pressurize the back 2 and to send the liquid is the same as that of either of each operation gestalt mentioned above.

[0043] The lid 56 is attached in the case 49 rotatable through the hinge 55. Moreover, the opening (notching) 52 of the couple for introducing said tube 9 in a case 49, and making a case 49 draw from the inside of a case 49 is formed. Furthermore, the heating unit 53 is formed in the base or internal surface of a case 49. In this case, although a heating unit 53 may be the usual heating wire which emits the Joule's heat, it may be microwave irradiation equipment which can warm a liquid directly by microwave.

[0044] As shown in drawing 10, a tube 9 is contained by the coiled form in a case 49 so that it may be easy to be warmed. Of course, as shown in drawing 11, a tube 9 is turned up and you may contain in a case 49 so that it may be easy to receive heat.

[0045] warming of such a configuration -- in sending a liquid inside of the body using liquid-sending equipment 701, first, the end of a tube 9 is connected to the back's 2 connection 8 through a puncture member, and it connects the other end of a tube 9 to the water pipe or endoscope (not shown) which inserts a liquid in the inside of the body. And it contains in a case 49 in drawing 10 or the condition like drawing 11 in the middle of [ a part of ] a tube 9. In this case, a tube 9 is contained for a lid 56 in a case 49 along with the notching 52 of a case 49 in the state of an open beam, and a lid 51 is shut. And in this condition, the electrical and electric equipment is supplied to a heating unit 53, and the physiological saline filled inside the tube 9 contained by the case 49 is heated. Therefore, the liquid in the tube 9 warmed by predetermined temperature can be sent inside of the body like each operation gestalt mentioned above.

[0046] Drawing 12 shows the 8th operation gestalt of this invention. warming which relates to this operation gestalt as shown in (a) of drawing 12 -- eating raw food in which liquid-sending equipment 801 is fixed to the stand for maintenance etc. -- warming which loops around and warms some flexible tubes 61 prolonged

from the back 60 -- it has the means 62. In addition, a means to pressurize the back 60 and to send the liquid is the same as that of either of each operation gestalt mentioned above.

[0047] it is shown in (b) of drawing 12 -- as -- warming -- a means 62 consists of a metal (for example, aluminum nature) member 63 of the shape of a cylinder fixed to the stand for said maintenance. The heater 65 is formed in the hollow part of the metal member 63. The lead wire 66 connected to a power source has connected with a heater 65. Moreover, the spiral slot 64 for twisting a tube 61 is established in the periphery of the metal member 63 covering the abbreviation overall length.

[0048] warming of such a configuration -- the case where a liquid is sent inside of the body using liquid-sending equipment 801 -- first -- eating raw food -- the end of the flexible tube 61 is connected to the back 60, and the other end of this tube 61 is connected to the nozzle which sprays a physiological saline on a patient's operation part. And a part is twisted around the spiral slot 64 of the metal member 63 in the middle of a tube 61.

[0049] Next, supply power to the lead wire 66 connected to the heater 65, a heater 65 is made to generate heat, and the metal member 63 is heated. In this case, the power supplied is adjusted so that the metal member 63 may be warmed at about 40 degrees C. When it lets a physiological saline pass in this condition in the tube 61 twisted around the spiral slot 64 of the metal member 63, the heat of the metal member 63 is a tube. Propagation and a physiological saline are warmed by the physiological saline before and after about 35 degrees C through 61. Therefore, the liquid in the tube 61 warmed by predetermined temperature can be sprayed on an operation part through said nozzle like each operation gestalt mentioned above.

[0050] as mentioned above, warming of this operation gestalt -- according to liquid-sending equipment 801 - eating raw food -- the duct from the back 60 to a patient -- on the way -- alike -- warming -- since the means was established -- beforehand -- eating raw food -- the need of warming the back 60 is lost.

Therefore, the manday of preparation of an operation is reducible. moreover, eating raw food which is not warmed even when a physiological saline goes out during an operation -- since the back 60 can be attached as it is, there are no worries about interruption of an operation. furthermore, a fear of a physiological saline getting cold, in order to warm just before injecting a physiological saline to a patient -- there is nothing -- warming safe for a patient -- liquid-sending equipment is realizable.

[0051] warming which showed drawing 13 by drawing 12 -- the modification of a means 62 is shown. warming of a graphic display -- means 62' consists of a heater 67 twisted around the periphery of a tube 61. With this configuration, if a current is passed at a heater 67, a tube 61 will be warmed by about 40 degrees C by generation of heat. The physiological saline which passes along a tube 61 is warmed by about 36 degrees C, and is supplied to a patient's affected part. warming -- since means 62' is constituted by only the heater 67 twisted around the periphery of a tube 61, it is compact and the equipment which does not take a tooth space and which is easy handling can be realized. In addition, a heater 67 may really be fabricated between the inner circumference of 61 of a tube, or an inside-and-outside periphery.

[0052] According to the technical content explained above, various kinds of configurations as shown below are obtained. 1. warming which has an application-of-pressure means send a gas to the body which surrounds said flexible container from an outside, and said body in the liquid-sending equipment which sends in a liquid in a living body's coelome through the insertion implement which connected a duct to the flexible container which enclosed the liquid, and connected at the head of this duct, and the exoergic section which are build in said body -- the liquid-sending equipment characterize by to have a means.

[0053] 2. Liquid-sending equipment characterized by to have heating means for two or more said flexible containers being prepared inside case which can contain, and said case, and keeping said flexible container warm, and press means push said flexible container and raise pressure, in liquid-sending equipment which sends in liquid in living body's coelome through insertion implement which connected duct to flexible container which enclosed liquid, and connected at head of this duct.

[0054] 3. Liquid-sending equipment given in the 1st term characterized by the exoergic section built in body being heater of shape of flexible field.

4. Liquid-sending equipment characterized by having heating means for heating some or all of said duct in liquid-sending equipment which sends in liquid in living body's coelome through insertion implement which connected at head of duct connected to container with which liquid was enclosed.

[0055] 5. Liquid-sending equipment given in the 4th term characterized by having means for said heating means being formed in case which can contain some or all of said duct, and said case, and detaching and attaching some or all of said duct, and heating means for being prepared in said case and heating some or all of said duct.

[0056]



[Effect of the Invention] As explained above, according to the liquid-sending equipment of this invention, warming and liquid sending of a liquid can be performed with small and easy structure.

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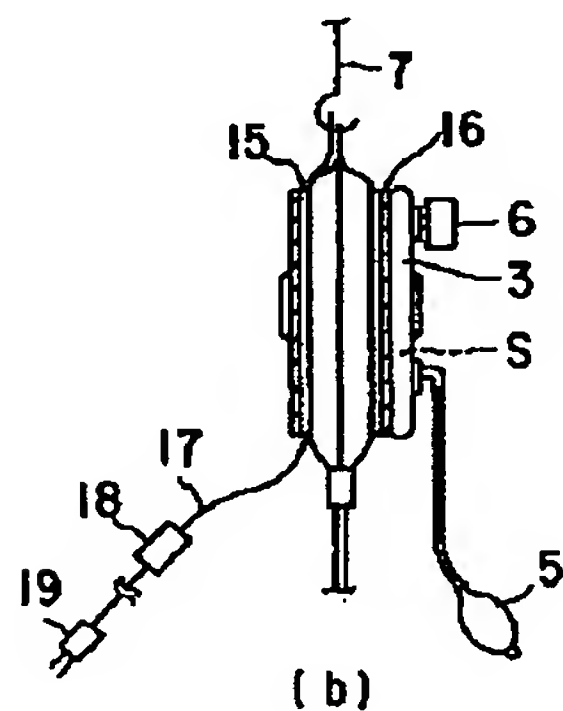
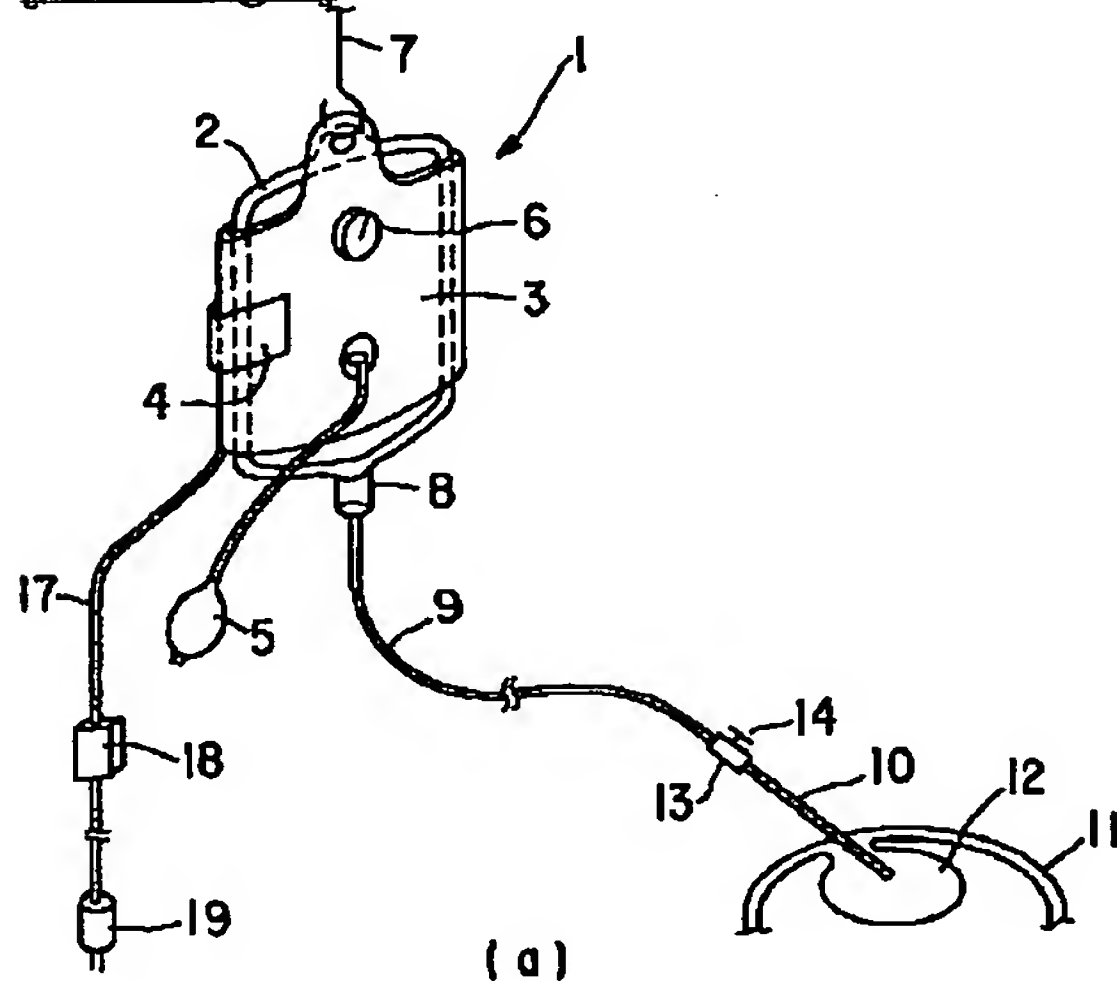
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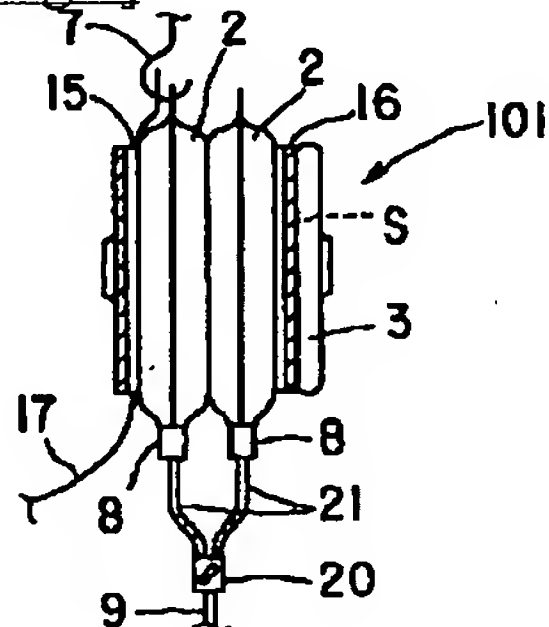
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3. In the drawings, any words are not translated.

## DRAWINGS

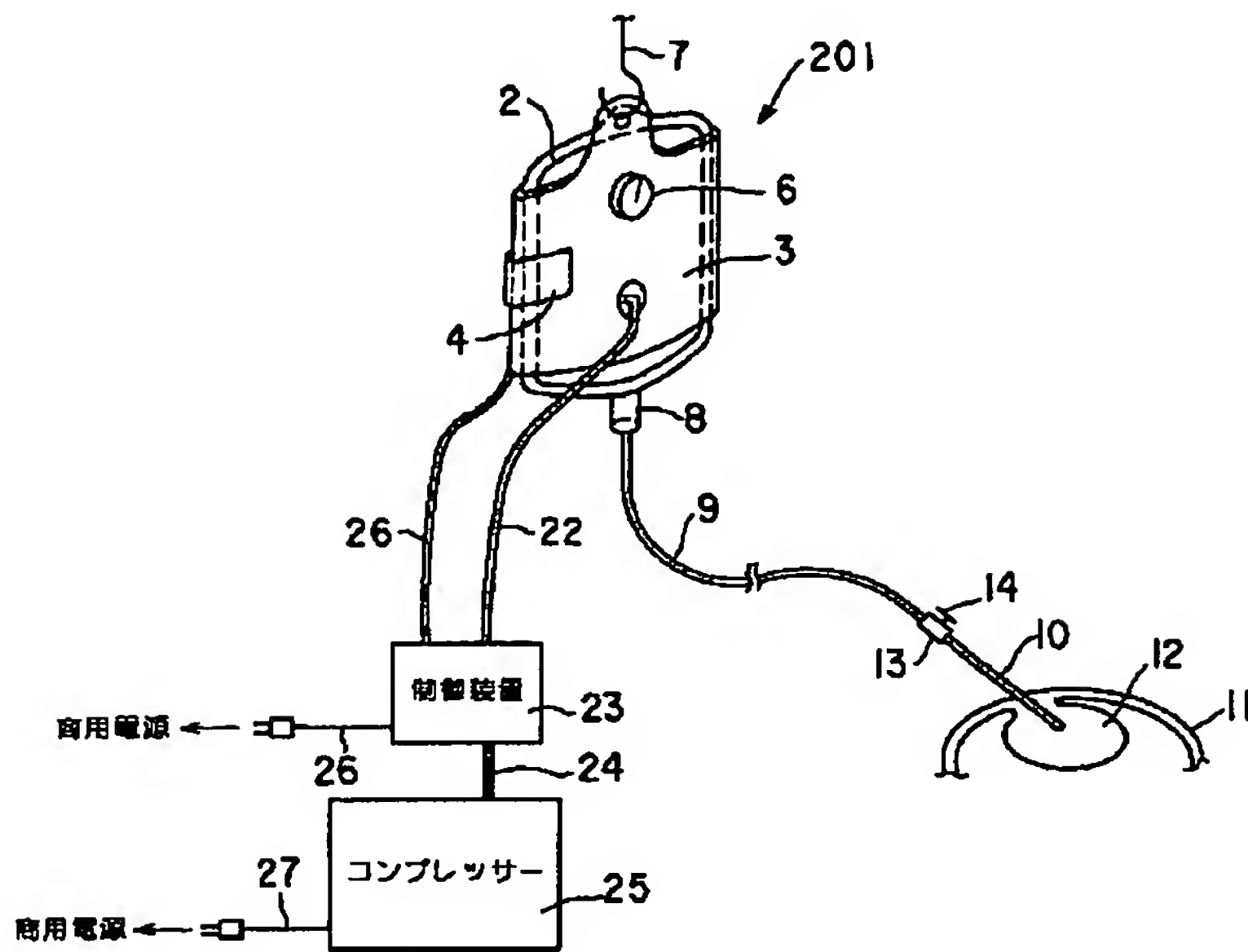
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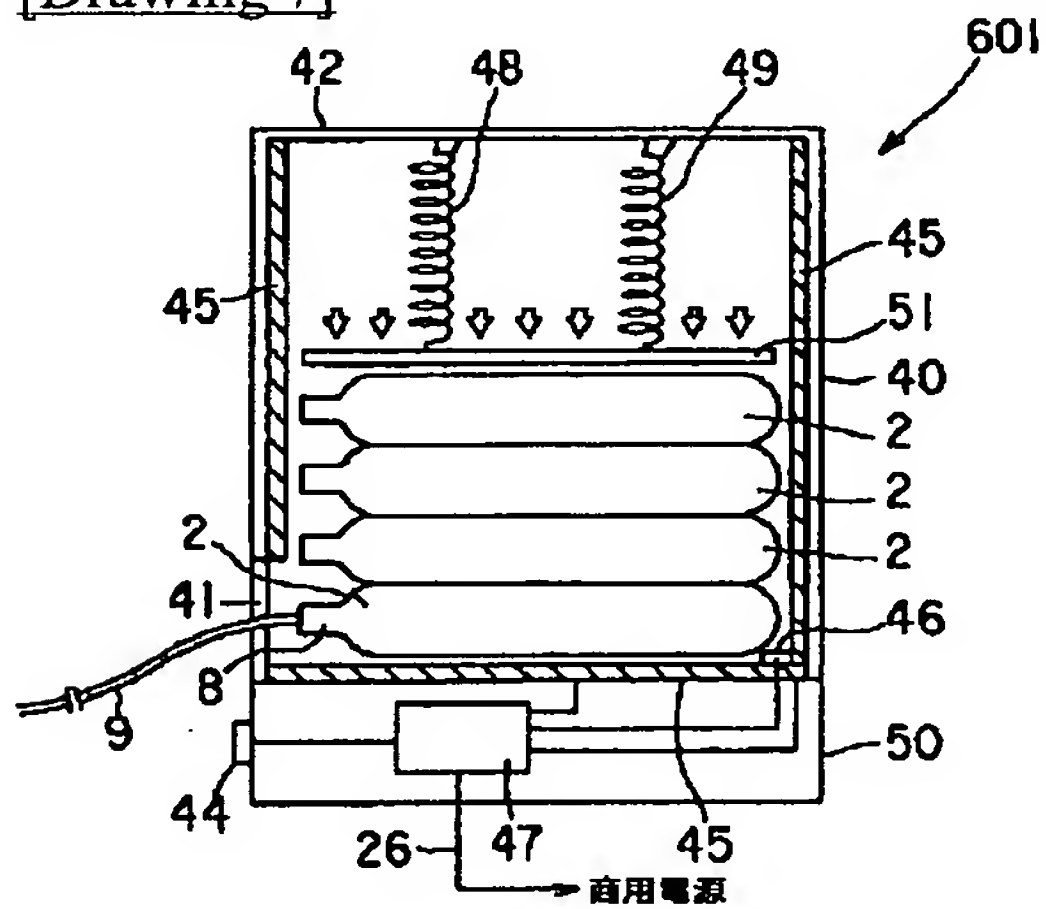
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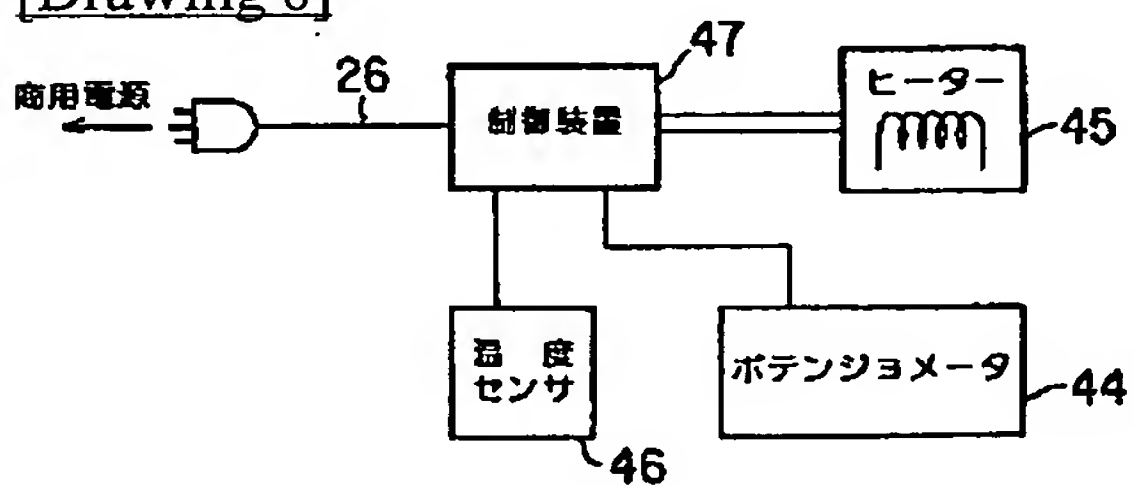
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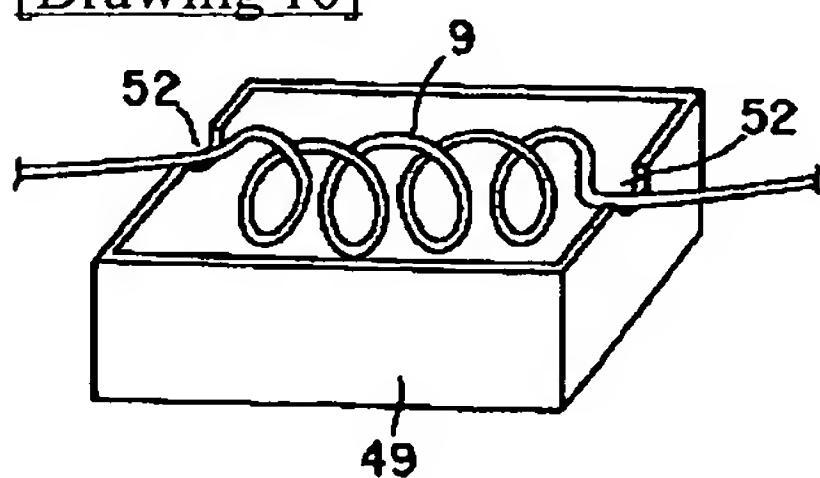
[Drawing 7]



[Drawing 8]

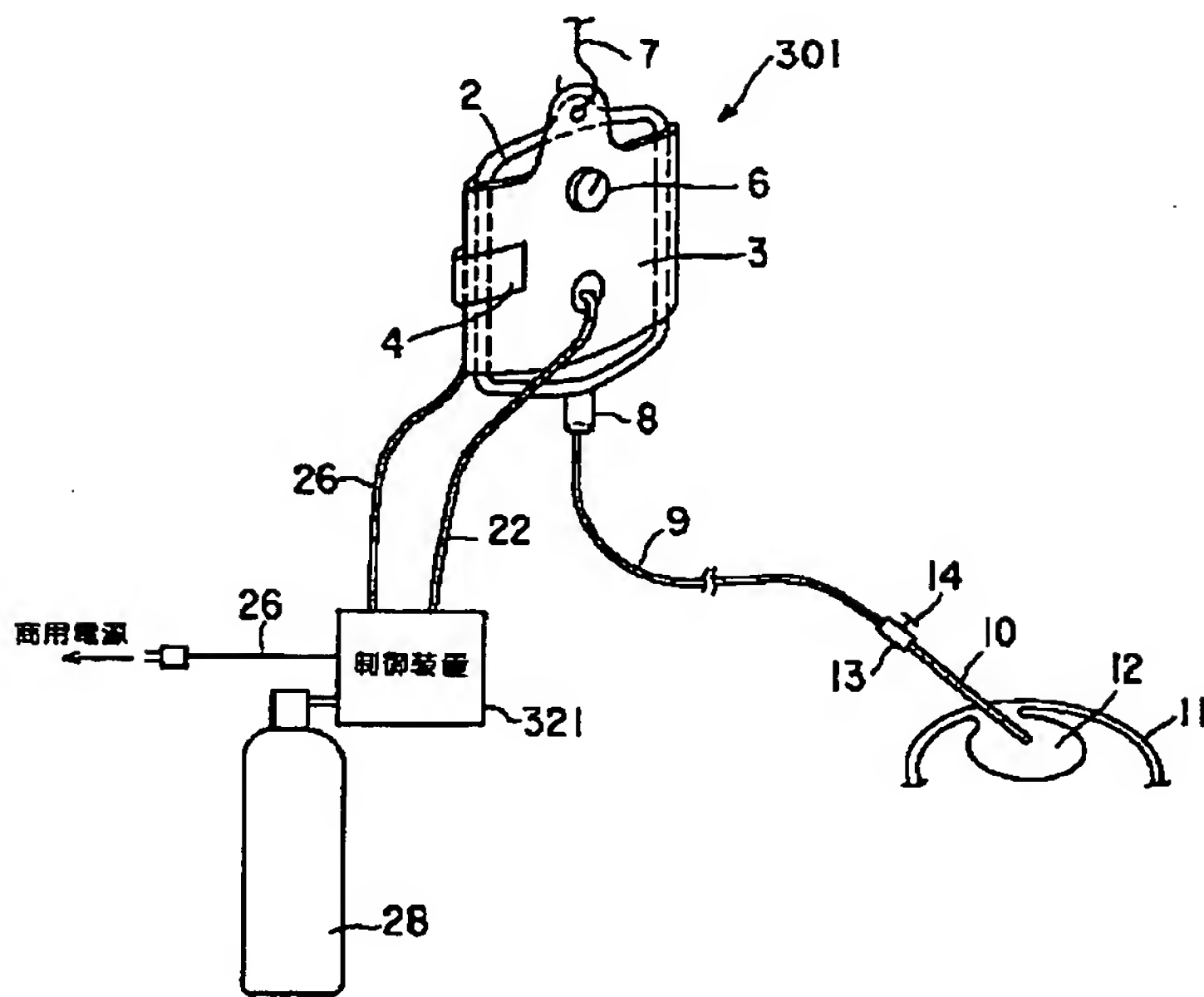


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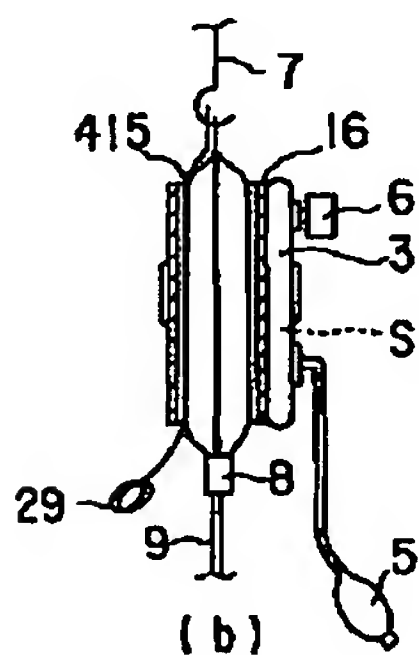
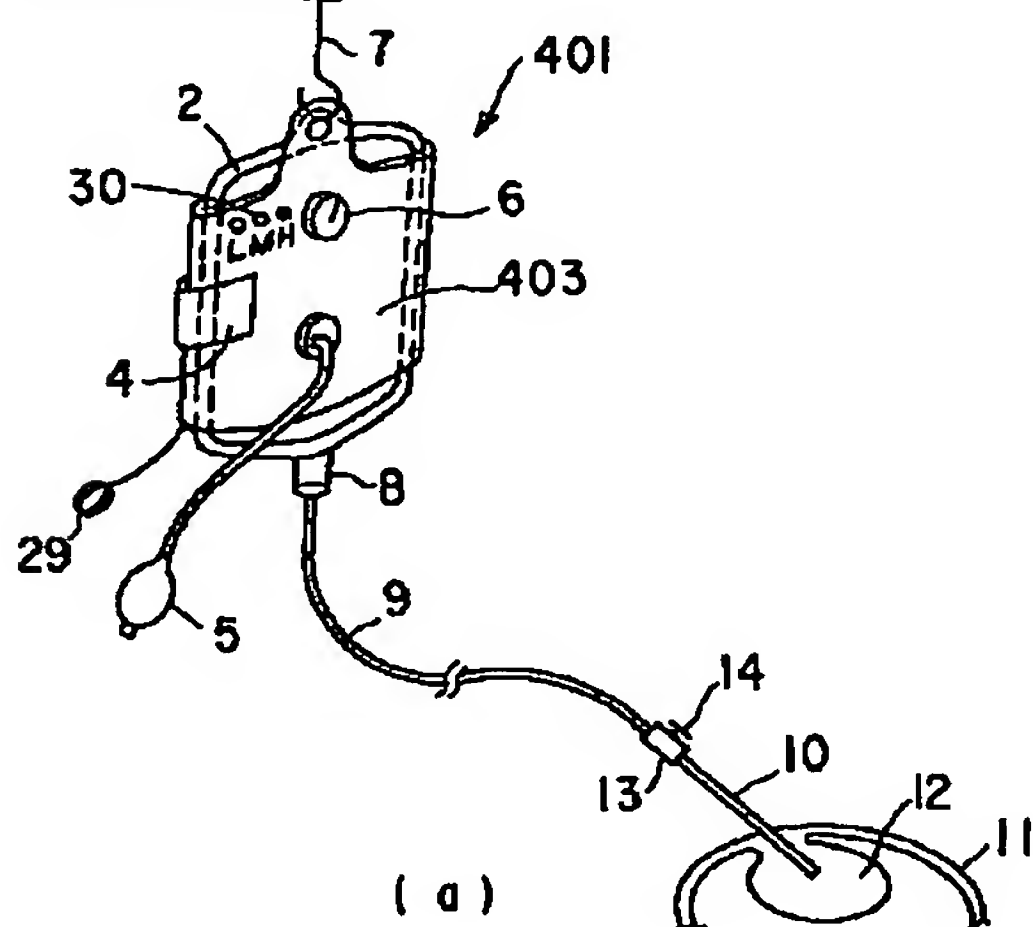


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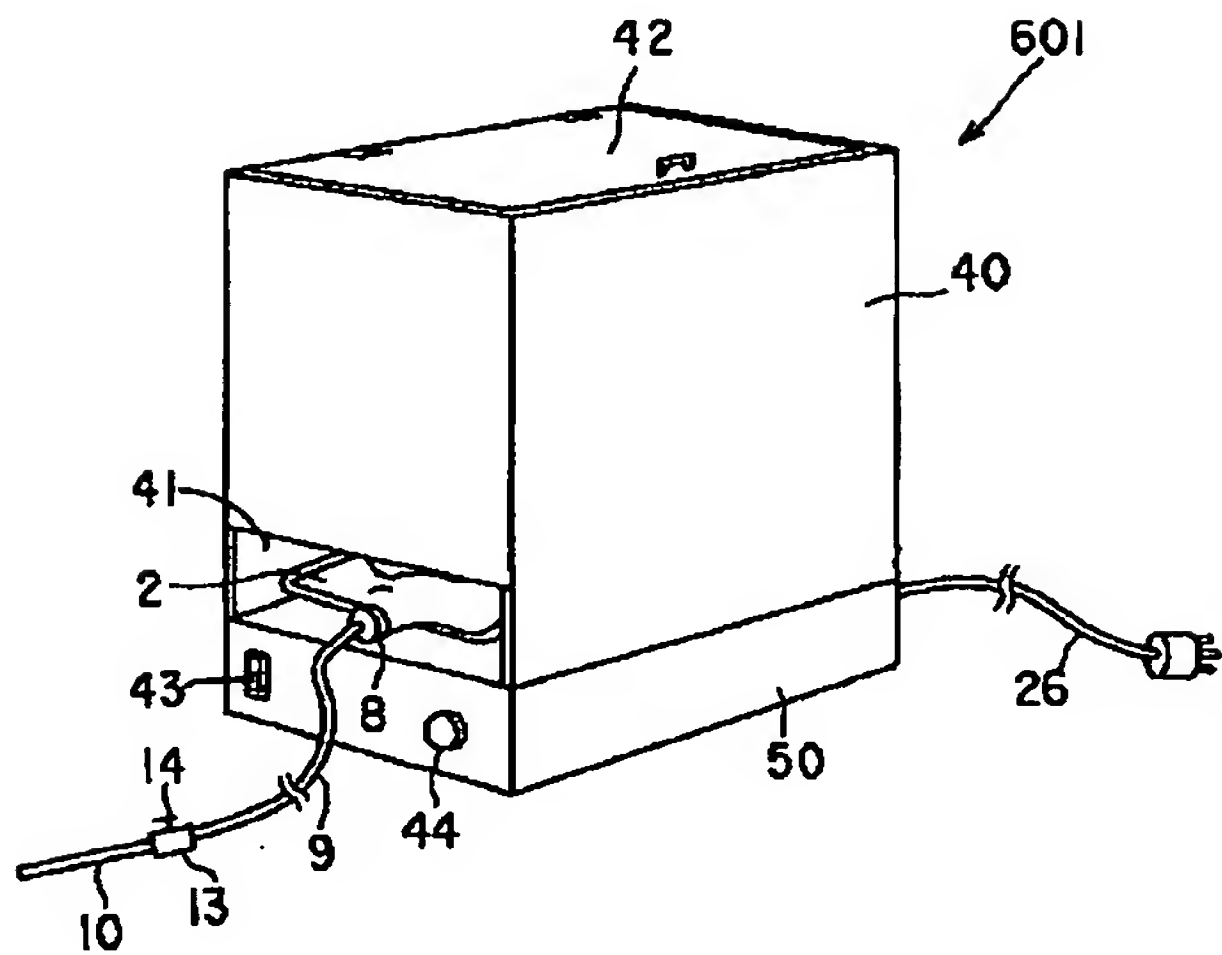




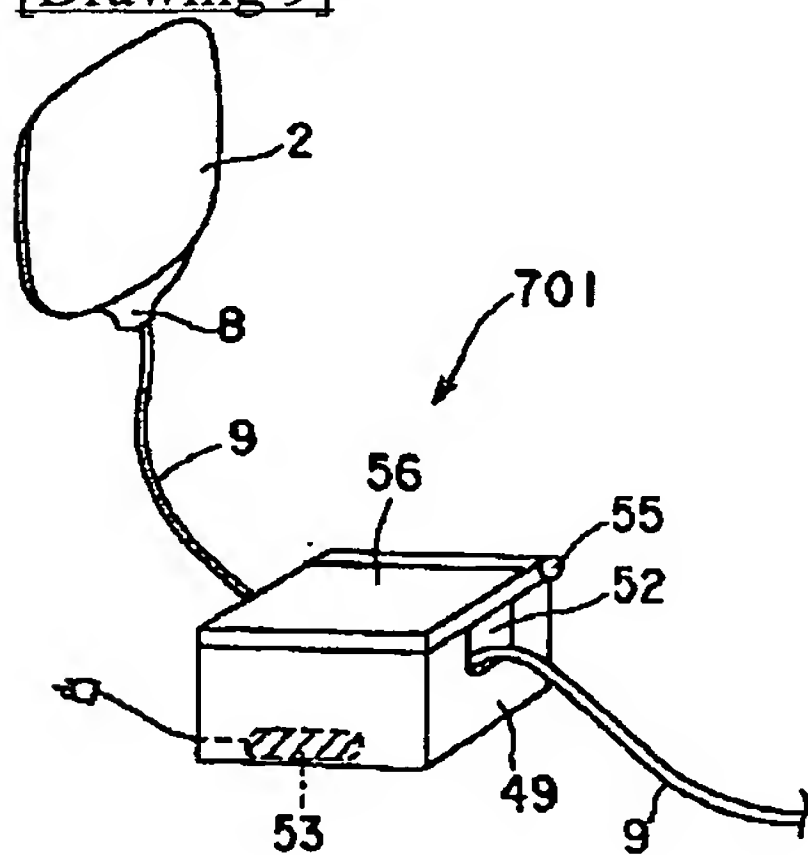
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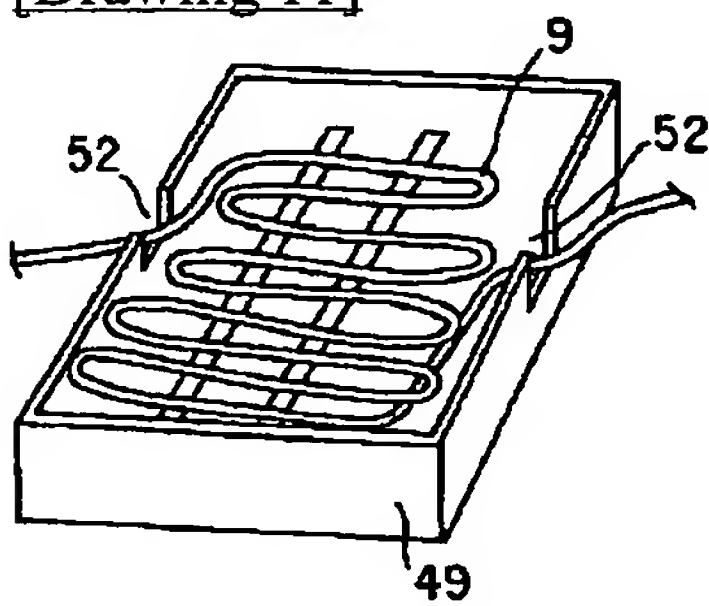
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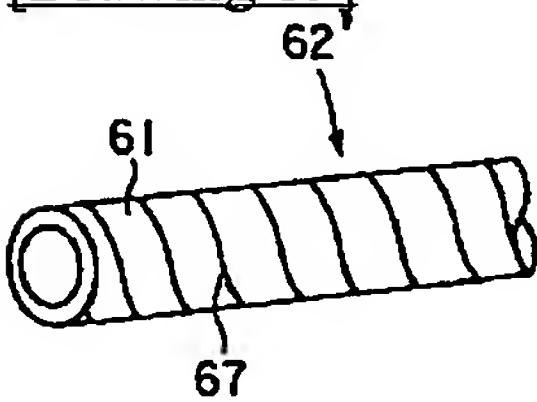
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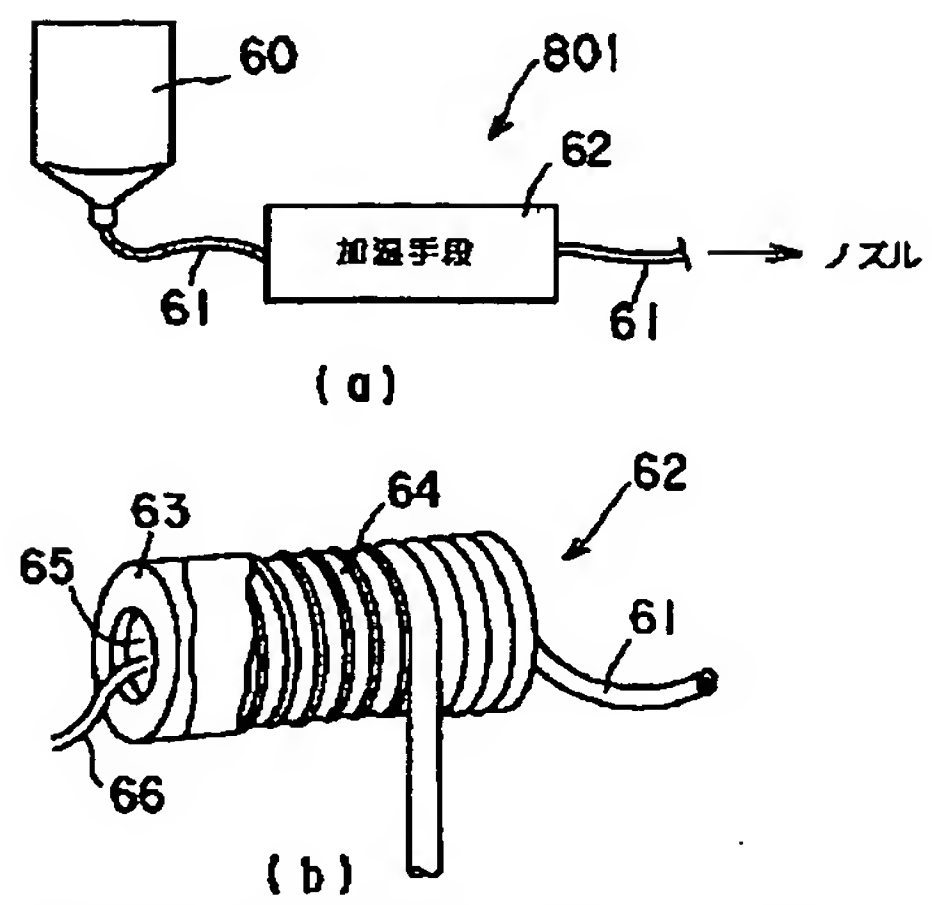
[Drawing 11]



[Drawing 13]



[Drawing 12]



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[Translation done.]



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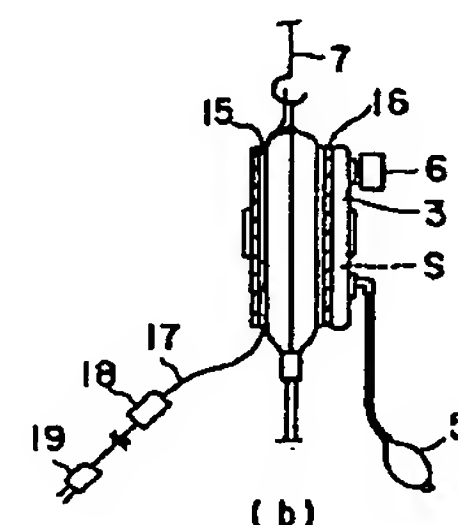
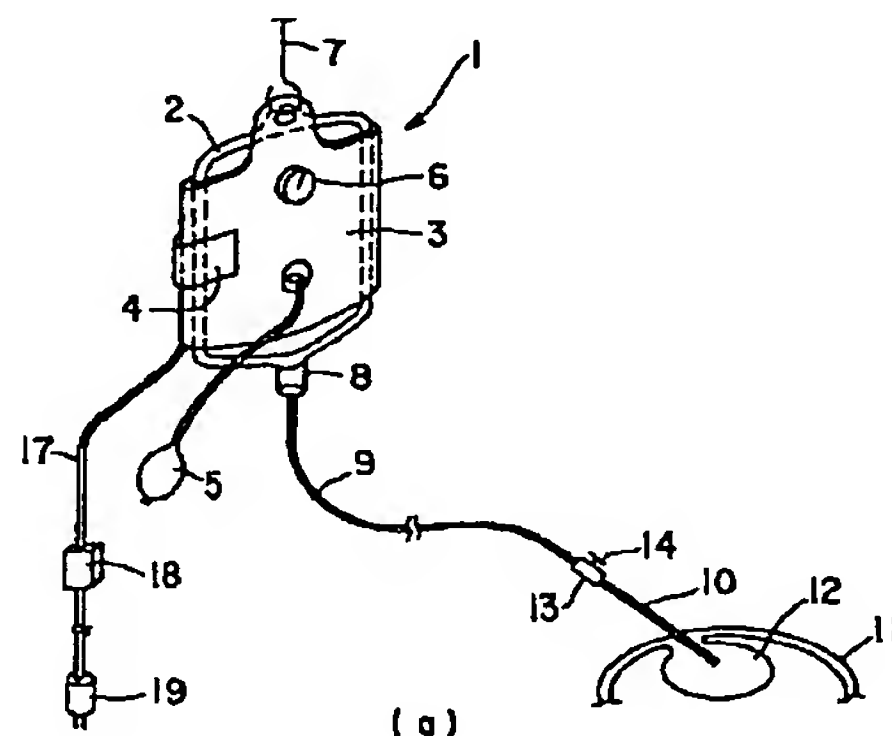
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(54) 【発明の名称】 送液装置

(57) 【要約】

【課題】 小型かつ簡単な構造で液体の加温および送液が可能な送液装置の提供を目的としている。

【解決手段】 本発明は、可撓性の容器2内に封入された液体を、容器2に接続される管路9を介して、体内に送出する送液装置1において、容器2を外側から包囲する膨縮可能な本体3と、本体3内に気体を供給して本体3を膨脹させ、本体3によって包囲された容器2を加圧する加圧手段5と、本体3に設けられ且つ本体3に包囲された容器2を加温する発熱部15、を有する加温手段と、を具備している。



チューブ9とが連通するようになっている。

【0013】図1の(b)に示すように、本体3は、バック2に密着される電熱線等からなる発熱層15と、発熱層15の外側に設けられた(積層された)断熱層16とを有している。この場合、断熱層16の一部は発熱層15と断熱層16との間に介挿している。発熱層15には電源ケーブル17が接続されており、この電源ケーブル17はスイッチ部18と電源コネクタ19とを介して商用電源に接続されるようになっている。なお、スイッチ部18は、電源のON/OFFを切換えられると同時に、サーモスタット等の温度制御手段を内蔵している。

【0014】次に、上記構成の加温送液装置1を用いて体腔内に液体を送液する場合について説明する。まず、本体3によってバック2を包み込むように加温送水装置1をバック2に取り付け、これによって発熱層15をバック2に密着させるとともに、留め部4によってこの密着状態を保持する。この状態で、本体3をバック2とともにフック7に吊り下げるとともに、発熱層15に接続された電源ケーブル17を電源コネクタ19を介して商用電源に電氣的に接続する。そして、内部空間S内が所定の圧力に達するまで、加圧手段5により空気を本体3の内部空間S内に供給する(これにより、本体3は膨脹してバック2を外側から圧迫する)。この場合、加圧手段5による内部空間S内への送気は、内部空間S内の圧力の値を圧力メーター6によって確認しながら行なう。また、これと平行して、スイッチ部18をON操作し、バック2内の液体を体温付近の温度(38~40℃)まで加温する。

【0015】次に、バック2の接続部8に穿刺部材を介してチューブ9の一端を接続し、このチューブ9の他端を人体11の体腔12内に挿入された送水管10の操作部13に接続する。なお、送水管10の操作部13には開閉バルブ14が設けられており、この開閉バルブ14を開閉操作することによって加温送液装置1から体腔12内への液体の流れを制御できるようになっている。無論、送水管10の代わりに体腔12内を観察する図示しない内視鏡の送液チャンネルにチューブ9を接続しても良い。

【0016】以上の作業が完了したら、図示しない内視鏡によって体腔12内を観察しながら、開閉バルブ14を開ける。これにより、体温付近に加温されたバック2内の液体がチューブ9から送水管10を介して一定量で体腔12内に送り込まれる。これにより、体腔12内が液体によって洗浄される。

【0017】以上説明したように、本実施形態の加温送液装置1は、バック2を外側から覆う本体3に空気を溜める内部空間Sと発熱層15とを設けただけの簡単な構成で、バック2内に封入された液体を加温してこれを送液することができる。すなわち、バック2を包み込むように本体3をバック2に装着して発熱層15をバック2

に密着させれば、滅菌された液体が封入されたバック2をそのままの状態に加温でき、しかも、本体3の内部空間S内に空気を供給することでバック2を加圧変形させれば、バック2内の加温された液体を体腔12内に簡単に送液できる。すなわち、小型かつ簡単な構造で液体の加温および送液を行なうことができる。したがって、術中に大量の液体を体内に注入しても、患者が体温低下等の合併症を起こすこともない。

【0018】図2は本発明の第2の実施形態を示している。図示のように、本実施形態の加温送液装置101は、複数のバック2…を備え付けることができるようにその本体3が大きく形成されている。また、送水管10の操作部13に接続するチューブ9は、切換えバルブ20を介して、各バック2…に接続される複数のチューブ21に連結されるようになっている。なお、それ以外の構成は第1の実施形態と同一である。

【0019】このような構成では、バック2の一方が空になった場合に、切換えバルブ20を操作して他方のバック2を使用することができる。つまり、複数のバック2…を備え付けることができるようにしたことにより、大量に洗浄液を消費する場合でもバック2を新たに付け替える手間を省くことができる。

【0020】図3は本発明の第3の実施形態を示している。本実施形態に係る加温送液装置201の本体3(第1の実施形態と同一構成)には、その内部空間Sと連通するチューブ22が接続されている。このチューブ22は制御装置23とチューブ24とを介してコンプレッサー25に接続されている。また、本体3の発熱層15は電源ケーブル26を介して制御装置23に電氣的に接続されている。なお、制御装置23およびコンプレッサー25はそれぞれ、電源ケーブル26、27を介して商用電源に接続されるようになっている。そして、この場合、制御装置23は、本体3の内部空間S内に所定圧の空気を送るようにコンプレッサー25の動作をON/OFF制御し、また、発熱層15を所定の温度に制御する。

【0021】このような構成の加温送液装置201を用いて体腔12内に液体を送液する場合には、まず、本体3によってバック2を包み込むように加温送水装置201をバック2に取り付け、これによって発熱層15をバック2に密着させるとともに、留め部4によってこの密着状態を保持する。この状態で、本体3をバック2とともにフック7に吊り下げるとともに、発熱層15に接続された電源ケーブル26と本体3に取り付けられたチューブ22とを制御装置23に接続し、制御装置23およびコンプレッサー25を、電源ケーブル26、27を介して、商用電源に接続する。

【0022】続いて、第1の実施形態と同様に、バック2の接続部8に穿刺部材を介してチューブ9の一端を接続し、このチューブ9の他端を人体11の体腔12内に

の上面は開閉可能な扉42によって形成されている。

【0035】図7に示すように、筐体40は、その内部に、生理食塩水等の液体が封入された複数のバック2…を互いに上方に積み重ねるようにして収納できるようになっている。筐体40の上面を形成する扉42の内側には2つのコイルバネ48、49の一端が固定されている。また、各コイルバネ48、49の他端には、筐体40内に収納される複数のバック2…を下方に向けて押圧するための押圧板50が固定されている。

【0036】筐体40の内面には、その上面（扉42の内側面）を除く部位に、平面状のヒーター45が張り付けられている。また、筐体40の底面には温度センサ46が設けられている。この場合、ヒーター45と温度センサ46はそれぞれ、制御部50内に配置された制御装置47と電気的に接続されている。また、制御部50側に設けられた前記ポテンシオメータ44も制御装置47に電気的に接続されている。また、制御装置47は電源ケーブル26を介して商用電源に接続されるようになっている。なお、これらの回路構成を示したブロック図が図8に示されている。

【0037】上記構成の加温送液装置601を用いてバック2内の液体を加温して送液する場合には、まず、バック2を必要数だけ筐体40内に積み重ねて扉42を閉じる。これによって、最も上側に位置するバック2に押圧板50が押し当てられ、積層状態の全てのバック2…がコイルバネ48、49の付勢力に伴う押圧板50の押圧力により加圧される。そして、この場合、最も下側に位置するバック2は、押圧板50による押圧力と上側に積層されたバック2…の重量とによって、その内圧が上昇する。

【0038】続いて、電源スイッチ43をONにし、ヒーター45への通電を行なう。この場合、制御装置47は、温度センサ46で測定された筐体40内の温度とポテンシオメータ44で設定された設定温度とに基づいてヒーター45への通電を制御し、筐体40内の温度をポテンシオメータ44で設定された設定温度に維持する。したがって、各バック2…内の液体の温度は、ポテンシオメータ44で設定された設定温度とほぼ等しい温度まで加温されて維持される。

【0039】次に、最も下側に位置するバック2の接続部8に穿刺部材を介してチューブ9の一端を接続し、このチューブ9の他端を体内に挿入される送水管10の操作部13に接続する。そして、この状態で、送水管10の開閉バルブ14を開けると、設定温度に加温されたバック2内の液体がチューブ9から送水管10を介して一定量で体内に送り込まれ、体内が液体によって洗浄される。

【0040】なお、最も下側に位置するバック2の液体が全て吐出された後は、筐体40の前面の開口部41からその空のバック2を引き抜く。これにより、空のバック

ク2の上側に位置していたバック2が押圧板50の押圧力によって押し下げられて、開口部41に位置する。

【0041】以上説明したように、本実施形態の加温送液装置601は、複数のバック2…を加温状態で備えることができるため、液体を大量に消費する場合でも加温の手間が省ける。また、次に使用するバック2が簡単な操作で準備されるため、バック2の交換が容易になる。

【0042】図9および図11は本発明の第7の実施形態を示している。図9に示すように、本実施形態に係る加温送液装置701は、生理食塩水等の液体が封入されたバック2から延びるチューブ9の一部を収納する筐体49を加温手段として有している。なお、バック2を加圧して送液する手段は前述した各実施形態のいずれかと同一である。

【0043】筐体49には、ヒンジ55を介して、蓋56が回動可能に取り付けられている。また、筐体49には、前記チューブ9を筐体49内に導入し且つ筐体49内から導出させるための一对の開口部（切り欠き）52が形成されている。さらに、筐体49の底面または内壁面には、加熱部53が設けられている。この場合、加熱部53は、ジュール熱を発する通常の電熱線であっても良いが、マイクロ波によって直接に液体を加温することができるマイクロ波照射装置であっても良い。

【0044】図10に示すように、チューブ9は、加温されやすいように、コイル状に筐体49内に収納される。無論、図11に示すように、熱を受けやすいようにチューブ9を折り返して筐体49内に収納しても良い。

【0045】このような構成の加温送液装置701を用いて体内に液体を送液する場合には、まず、バック2の接続部8に穿刺部材を介してチューブ9の一端を接続し、体内に液体を挿入する送水管または内視鏡（図示せず）にチューブ9の他端を接続する。そして、チューブ9の途中の一部を図10または図11のような状態で筐体49内に収納する。この場合、蓋56を開けた状態でチューブ9を筐体49の切り欠き52に沿って筐体49内に収納し、蓋56を閉める。そして、この状態で、加熱部53に電気を供給し、筐体49に収納されたチューブ9の内部に満たされた生理食塩水を加熱する。したがって、前述した各実施形態と同様にして、所定温度に加温されたチューブ9内の液体を体内に送液することができる。

【0046】図12は本発明の第8の実施形態を示している。図12の（a）に示すように、本実施形態に係る加温送液装置801は、保持用のスタンド等に固定される生食バック60から延びる可撓性のチューブ61の一部を巻装して加温する加温手段62を有している。なお、バック60を加圧して送液する手段は前述した各実施形態のいずれかと同一である。

【0047】図12の（b）に示すように、加温手段62は、前記保持用のスタンドに固定される円筒状の金属



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【図11】図9の加温送液装置の加温手段を構成する筐体内にチューブを収納する第2の態様を示す図である。

【図12】(a)は本発明の第8の実施形態に係る加温送液装置の全体を概略的に示す図、(b)は(a)の加温送液装置の加温手段の構成を示す斜視図である。

【図13】図12で示した加温手段の変形例を示す斜視図である。

\*【符号の説明】

1, 201, 301, 401…加温送液装置

2…バック（容器）

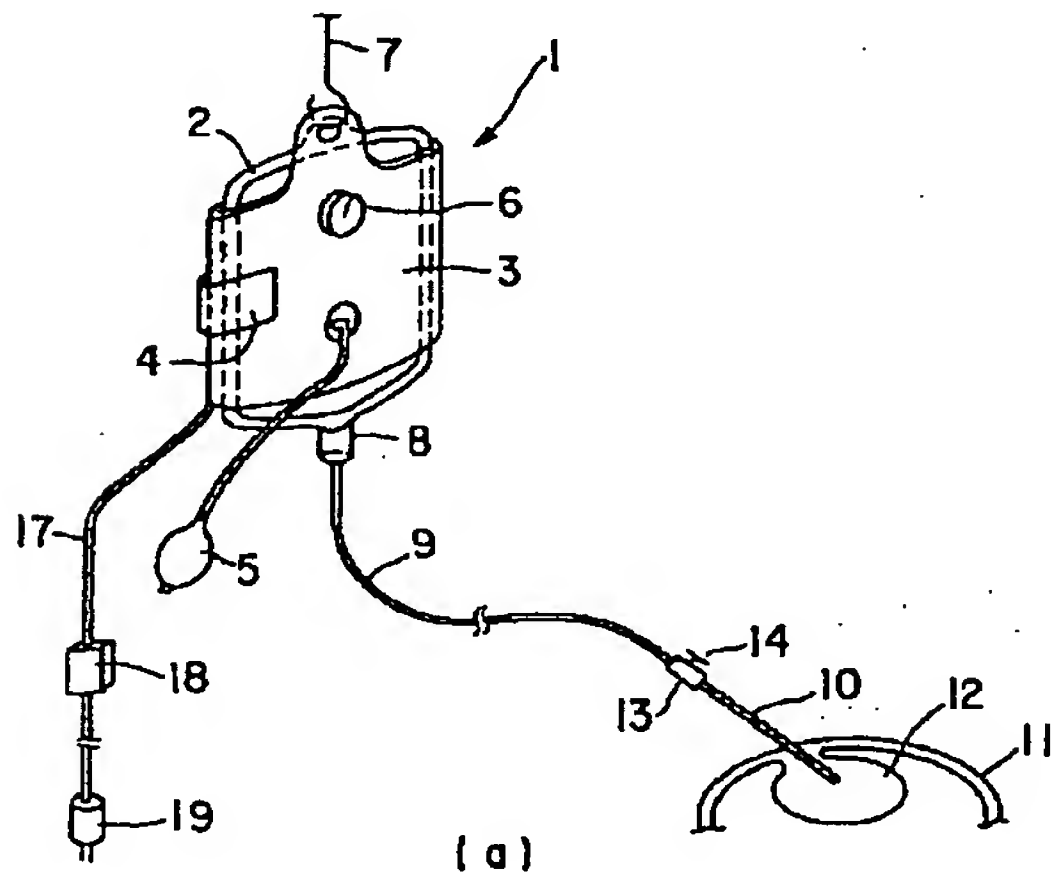
3…本体

5…加圧手段

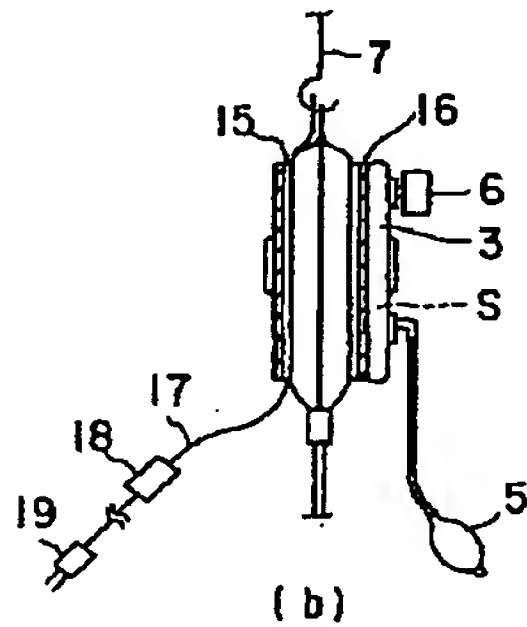
9…チューブ（管路）

\* 15…発熱層（発熱部）

【図1】

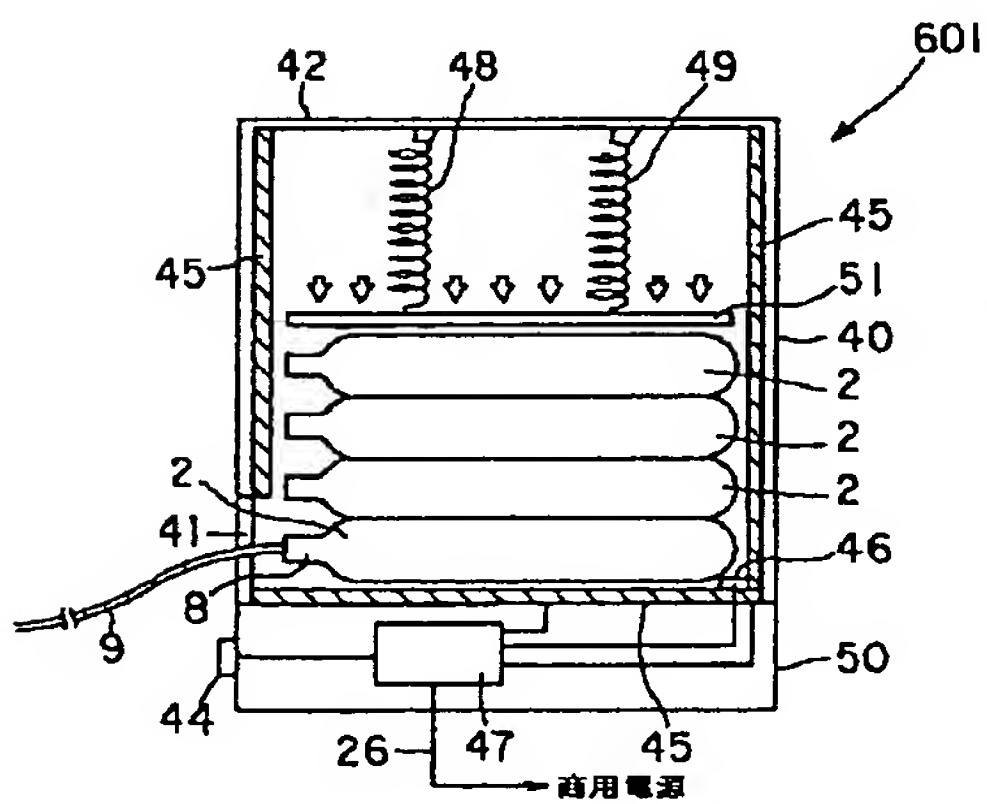


(a)

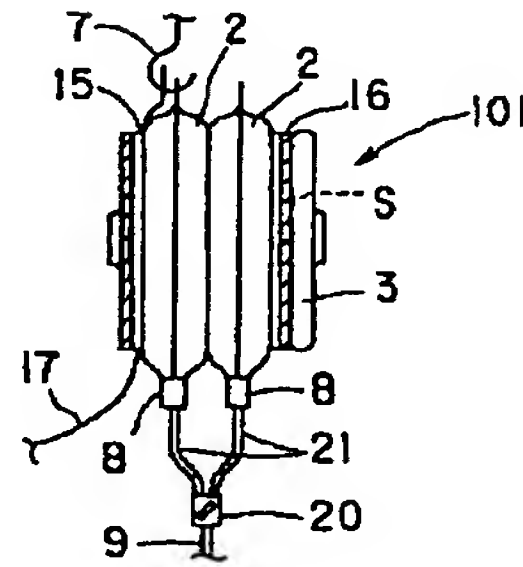


(b)

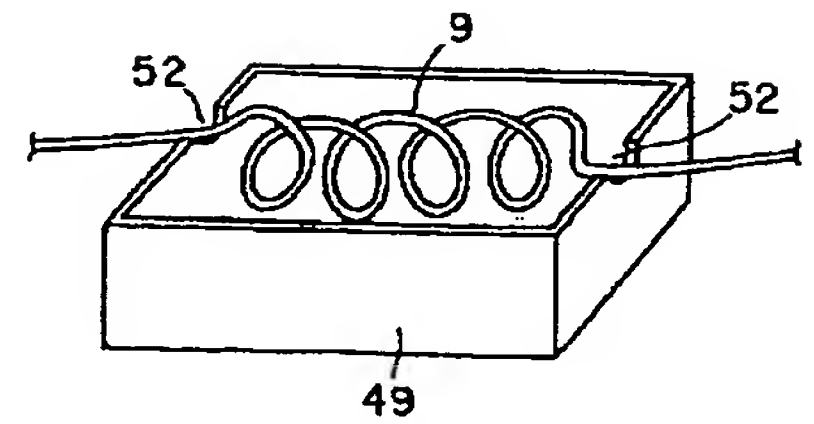
【図7】



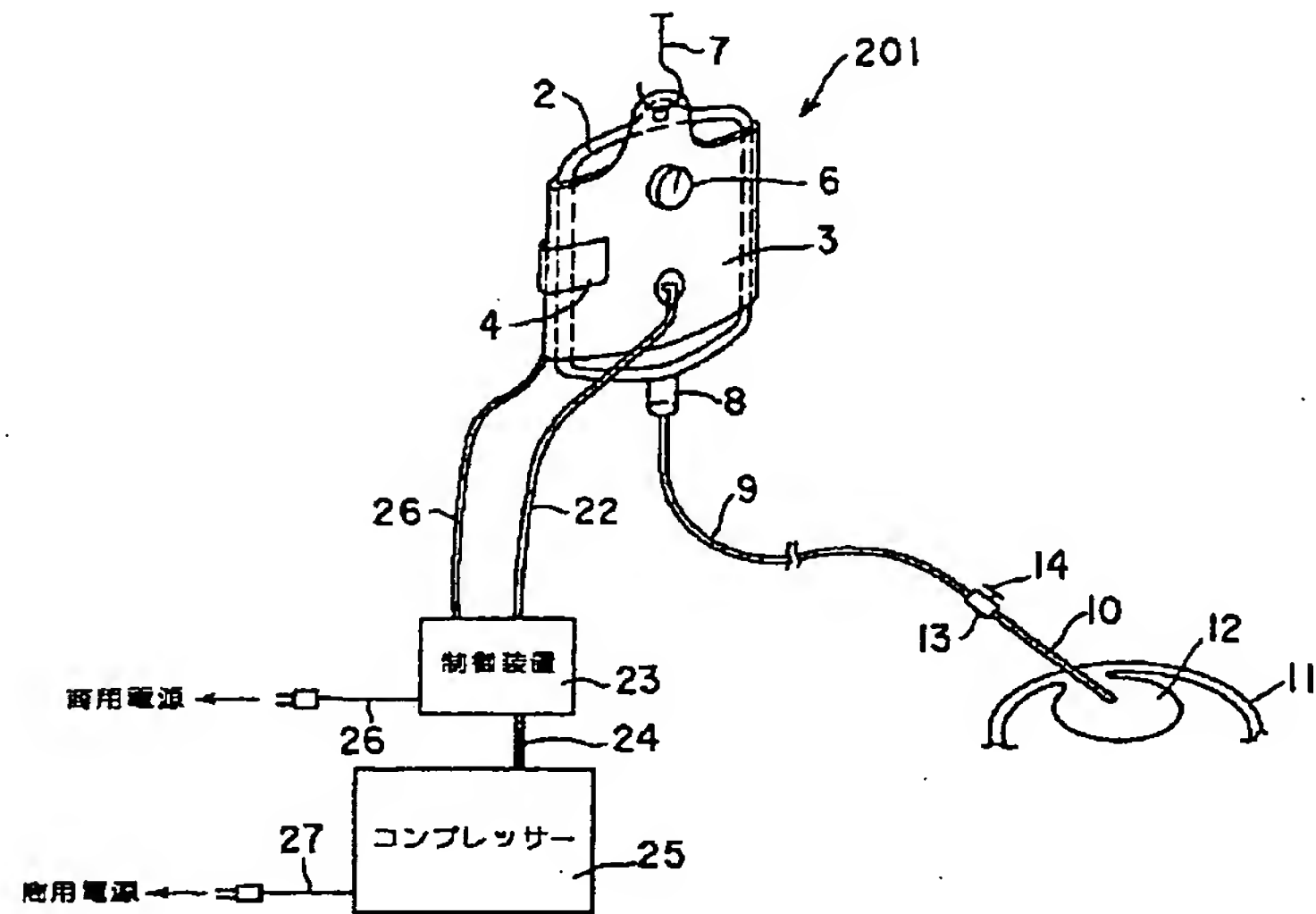
【図2】



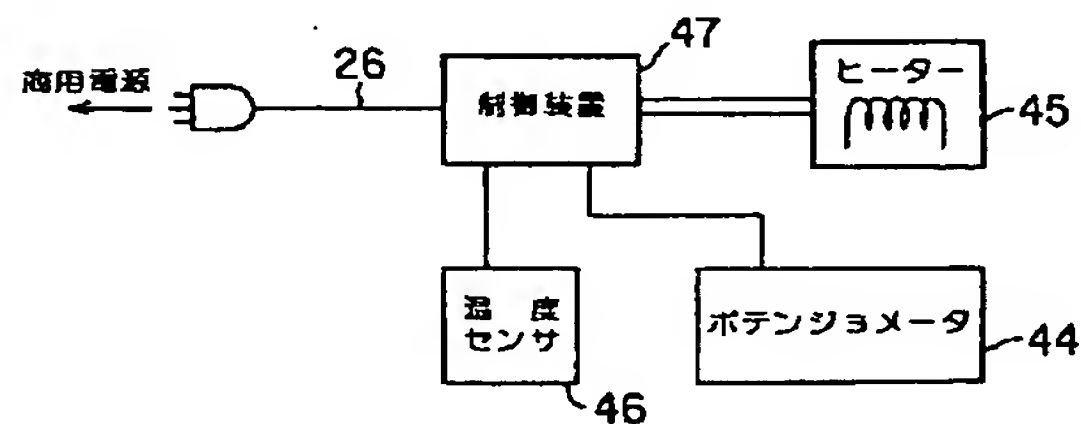
【図10】



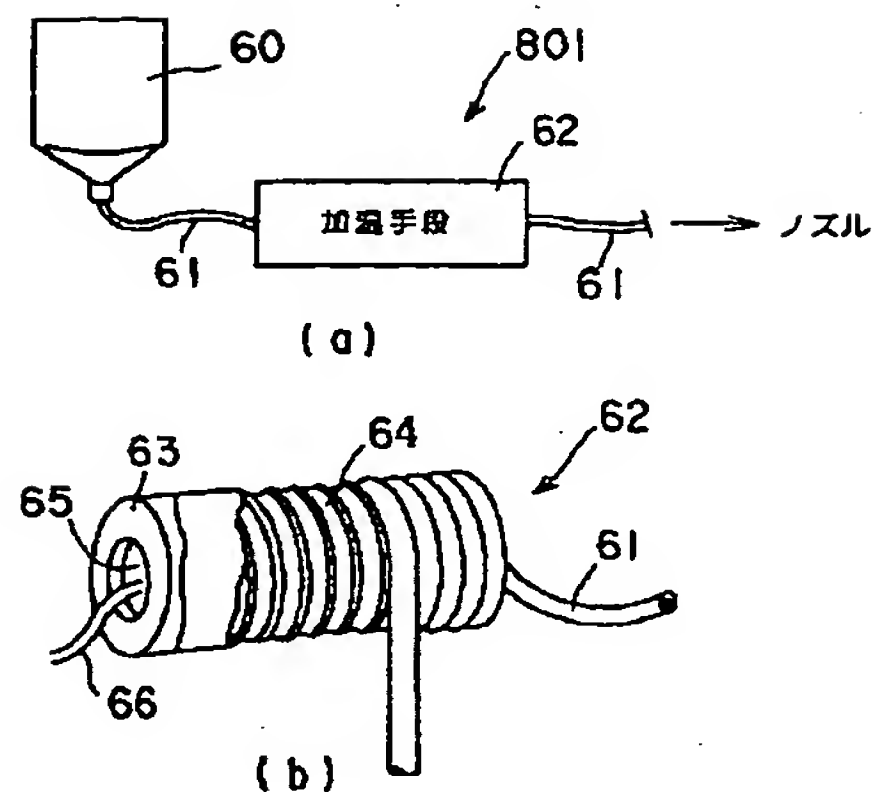
【図3】



【図8】



【図12】



フロントページの続き

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